

Problem Solving

STUDENT OBJECTIVES

- Identify problems
- Generate possible solutions
- Analyze consequences and effects
- Develop criteria for evaluating solutions

RESOURCES AND PREPARATION

You will need photocopies for students of:

- **Student Lesson Summary**, p. 137
- **Teaching Model**, “Problem: Park Sculptures,” p. 138
- **Practice Worksheets**, Levels A and B, pp. 139–140
- **Reteaching Worksheet**, p. 141

You will also need:

- **Transparency**, Graphic Organizer. **NOTE:** You may wish to distribute copies of the transparencies to students.

Teach

1. **Problem Solving:** Point out that **problem solving** is a real life skill. People need to solve problems, sometimes minor, sometimes major, every single day. Doing so requires looking at all the options and choosing the one that has the most desirable consequences. Ask students to generate a quick list of problems, small or large, that they may have solved in the last 24 hours. Accept all reasonable answers, as you write the list. (*Samples: untying a knot, solving word problems, carrying a heavy backpack, choosing a good topic for a report, conflicts in a group-choice or shared space, etc.*)
2. **Teaching Problem Solving:** Distribute the **Lesson Summary** and preview the **Academic Vocabulary**. Introduce the **Here's How** steps for problem solving.
 - **Problem:** Emphasize that the first step is clarifying the problem, expressing it in the most straightforward way possible.
 - **Possible Solutions:** Note that students should freely brainstorm and accept all ideas, as they generate possible solutions. Stress that they should not dismiss any ideas at this stage in the process.
 - **Effects and Consequences:** Tell students to consider the most important outcomes, both positive and negative, that would result from each possible solution.
 - **Criteria to Judge:** Point out that different people will have different criteria for evaluating the effects and consequences of each solution. For a very busy person, “not time-consuming” might be a highly important criterion. A person with plenty of spare time might not use that criterion.
 - **Preferred Alternative:** Emphasize that often there is more than one acceptable way to solve a problem. By identifying his or her own criteria, the problem solver can decide on the solution most effective, or most desirable for his or her situation.
3. **Guided Practice:** Distribute copies of the **Teaching Model**, “Problem: Park Sculptures.” Then display the **Transparency**, Graphic Organizer. Read the problem presented on the **Teaching Model** aloud. Then guide students through the process of applying the problem-solving steps. As students generate responses, record their ideas on the **Transparency**. **NOTE:** You may also wish to distribute copies of the

transparency to students or small groups of students, so that they may record answers as they follow along.

- **Problem:** Have a volunteer describe the problem in one complete sentence. (*People are vandalizing sculptures in the park after security guards go home for the evening.*)
- **Possible Solutions:** Ask the class to brainstorm some possible solutions. Stress that it doesn't matter if the solutions have problems or are incomplete or unfeasible. Do not accept any fault-finding comments. (*Sample: close the park at night; remove the sculptures from the park; have security guards stay later in the evening.*)
- **Effects and Consequences:** Discuss both positive and negative **outcomes** for each proposed solution. (*Samples: "1: (+) people can't get in to vandalize the sculptures / (–) no one will be able to enjoy the park at night; "2: (+) the sculptures won't be damaged / (–) no one can enjoy looking at the sculptures; "3 (+) the park stays open and vandalism will stop / (–) it may be costly to pay for the security guards' extended hours*)
- **Criteria:** Ask students what criteria they might use to evaluate the solutions. (*Sample: keeping the sculptures undamaged; public enjoyment of the sculptures; evening access to the park; financial expense*)
- **Preferred Solution:** Have student volunteers choose an important criteria, explaining why and under what circumstances that criteria is important. Then have them choose which different solutions would be preferred depending on the criteria chosen. For example, if "evening access to the park" is chosen as the primary criteria, option 1 would be the worst choice. If "expense" is primary, however, option 1 might be considered, along with option 2. If it isn't, option 3 might be the preferred solution.

QUICK CHECK. Ask students to imagine they are choosing a place to hold a birthday party: at home, in a park, or in a rented location. Have them generate criteria they might use for deciding between the different locations. (*Sample: size, protection from weather, expense, fun.*)

Practice and Apply

Activities involving problem solving appear on pp. 139–140.

- Assign **Practice Worksheet A** to students who need more structured activities.
- Assign **Practice Worksheet B** to grade-level and above-level students.

Sample Answers: Practice Worksheet A

1. *Option 1—Positive: mother will get a perfect frame; negative: she won't get it on her birthday*
2. *Option 2—Positive: mother will get present on birthday; negative: her present is scratched*
3. *Option 3—Positive: mother will get present on birthday; negative: mother may not love alternative present as much*
4. *Criteria—timeliness, most loved present, present in perfect condition*

Sample Answers: Practice Worksheet B

1. *Problem statement—Kevin must decide between honoring a promise and accepting his boss's offer.*
2. *Possible solutions—1: go to hockey game; 2: teach sister to skate; 3: see if his sister can go to game too*
3. *Option 1—Positive: Kevin will enjoy game/not offend boss; negative: sister will be unhappy; Option 2—Positive: promise will be kept; negative: Kevin will miss game, boss may be unhappy; Option 3—Positive: everyone may be happy; negative: sister may not want to go*
4. *Criteria—Kevin's happiness; sister's happiness; keeping promise; not offending boss*
5. *Preferred Solution—Accept any choice that is justified by (or matched to) a chosen criteria.*

Assess and Reteach

Use these guidelines to determine if students need the **Reteaching Worksheet**.

- **Practice Worksheet A:** Students should be able to fully complete the organizer, such that there is a positive and negative consequence for each possible solution, and at least three criteria for judging the options.
- **Practice Worksheet B:** Students should be able to complete the organizer such that there are at least three possible solutions, is a positive and negative consequence for each one, at least three criteria for judging the options, and a choice for a preferred solution that is justified by (or matched to) a chosen criteria.

For students who need reteaching, review the steps on the **Student Lesson Summary** and the completed **Graphic Organizer** for the **Teaching Model** problem-solving scenario. Then have students complete the **Reteaching Worksheet**, p. 141.

Sample Answers: Reteaching Worksheet

1. *b*
2. *The pies will taste great.*
3. *Liam will be late for the bake sale.*
4. *Liam will arrive at the bake sale on time.*
5. *The pies may not taste as good.*
6. *solution 1*